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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/813,785	03/30/2004	Wen-Chi Chou	67,200-1164	5201

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EXAMINER

OLSEN, ALLAN W

ART UNIT	PAPER NUMBER
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1763

DATE MAILED: 03/22/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/813,785

Applicant(s)

CHOU ET AL.

Examiner

Allan Olsen

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 March 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 30 March 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-6, 11, and 13-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over the Admitted Prior Art in view of Matsumoto (US 2004/001466).

With respect to Claim 1: The Admitted Prior Art discloses a process having a pedestal assembly for supporting a substrate (Fig. 1 Item 18) and at least one antenna provided in said pedestal assembly (Fig. 2 Item 42) for conducting bias power, comprising the step of processing said substrate in said process chamber (Paragraph 7).

The Admitted Prior art does not expressly state that the process comprises a step for removing said at least one antenna from said pedestal assembly.

Matsumoto discloses a removable antenna (Fig. 10 Item 10a, Paragraph 77) from an insulating tube (Fig. 10 Item 10b, Paragraph 58) within a process chamber (Fig. 10 Item 1). The Admitted Prior Art and Matsumoto are analogous art because they are from the same field of endeavor, namely plasma processing systems.

At the time of invention, it would have been obvious to form the process of the admitted prior art including a step for removing said at least one antenna from said pedestal assembly in view of the teaching of Matsumoto. The suggestion or motivation

for doing so would have been to change the position of the antenna, whereby the plasma distribution in the process chamber can be changed (Paragraph 77).

With respect to Claim 2: The Admitted Prior Art discloses that electrical arcing induces operational power loss and requires re-tuning of the source power supply and/or the RF (Fig. 1 Item 26) match network (Fig. 1 Item 30) to stabilize the operational power (Paragraph 11). Therefore, the Admitted Prior Art comprises the steps of applying a first magnitude of source power to said process chamber and applying a second magnitude of source power to said process chamber after applying said first magnitude of source power, since returning requires at least two magnitudes of source power to be applied.

With respect to Claim 3: Matsumoto discloses that said removing said at least one antenna from said pedestal assembly comprises the step of removing said at least one antenna (Fig. 10 Item 10a, Paragraph 77) from at least one antenna opening (Fig. 10 Item 10b) in said pedestal assembly and further comprising the step of filling said at least one antenna opening (Fig. 10 Item 10b, Paragraph 77). The antennae or position of each antenna (Fig. 10 Item 10a) are movable or changeable, depending on conditions such as process gas, pressure, and electric power.

With respect to Claim 4: The Admitted Prior Art discloses that electrical arcing induces operational power loss and requires re-tuning of the source power supply and/or the RF (Fig. 1 Item 26) match network (Fig. 1 Item 30) to stabilize the operational power (Paragraph 11). Therefore, the Admitted Prior Art comprises the steps of applying a first magnitude of source power to said process chamber and applying a

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second magnitude of source power to said process chamber after applying said first magnitude of source power, since returning requires at least two magnitudes of source power to be applied.

With respect to Claim 5: The Admitted Prior Art discloses said pedestal assembly (Fig. 2 Item 34) comprises an insulator (Fig. 2 Item 36) and a pedestal carried by said insulator for supporting said substrate (Fig. 2 Item 32), and wherein said at least one antenna opening extends through said insulator (Fig. 2 Item 42).

With respect to Claim 6: The Admitted Prior Art discloses that electrical arcing induces operational power loss and requires re-tuning of the source power supply and/or the RF (Fig. 1 Item 26) match network (Fig. 1 Item 30) to stabilize the operational power (Paragraph 11). Therefore, the Admitted Prior Art comprises the steps of applying a first magnitude of source power to said process chamber and applying a second magnitude of source power to said process chamber after applying said first magnitude of source power, since returning requires at least two magnitudes of source power to be applied.

With respect to Claim 11: The Admitted Prior Art discloses that said pedestal comprises aluminum (Paragraph 9).

With respect to Claim 13: The Admitted Prior Art discloses a process in a pre-clean chamber (Paragraph 6) having a pedestal assembly (Fig. 2 Item 34) for supporting a substrate (Fig. 2 Item 32) and a plurality of antennae (Fig. 2 Item 42, Paragraph 9) provided in said pedestal assembly for conducting bias power (Paragraph

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5), comprising a step of subjecting said substrate to a pre-clean etch process in said pre-clean chamber (Paragraph 6).

The Admitted Prior Art does not expressly state a step removing said plurality of antennae from said pedestal assembly.

Matsumoto discloses a plurality of removable antennae (Fig. 10 Item 10a, Paragraph 77) from insulating tubes (Fig. 10 Item 10b, Paragraph 58) within a process chamber (Fig. 10 Item 1). The Admitted Prior Art and Matsumoto are analogous art because they are from the same field of endeavor, namely plasma processing systems.

At the time of invention, it would have been obvious to form the process of the admitted prior art including a step removing said plurality of antennae from said pedestal assembly in view of the teaching of Matsumoto. The suggestion or motivation for doing so would have been to change the position of the antenna, whereby the plasma distribution in the process chamber can be changed (Paragraph 77).

With respect to Claim 14: The Admitted Prior Art discloses that electrical arcing induces operational power loss and requires re-tuning of the source power supply and/or the RF (Fig. 1 Item 26) match network (Fig. 1 Item 30) to stabilize the operational power (Paragraph 11). Therefore, the Admitted Prior Art comprises the steps of applying a first magnitude of source power to said process chamber and applying a second magnitude of source power to said process chamber after applying said first magnitude of source power, since returning requires at least two magnitudes of source power to be applied.

With respect to Claim 15: The Admitted Prior Art discloses that said pedestal assembly (Fig. 2 Item 34) comprises an insulator (Fig. 2 Item 36) and a pedestal (Fig. 2 Item 40) carried by said insulator for supporting said substrate (Fig. 2 Item 32).

With respect to Claim 16: Matsumoto discloses that said removing said plurality of antennae (Fig. 10 Item 10a) comprises the step of removing said plurality of antennae (Fig. 10 Item 10a) from a plurality of antenna openings (Fig. 10 Item 10b) and further comprising the step of filling (Paragraph 77) said plurality of antenna openings (Fig. 10 Item 10b).

With respect to Claim 17: The Admitted Prior Art discloses that electrical arcing induces operational power loss and requires re-tuning of the source power supply and/or the RF (Fig. 1 Item 26) match network (Fig. 1 Item 30) to stabilize the operational power (Paragraph 11). Therefore, the Admitted Prior Art comprises the steps of applying a first magnitude of source power to said pre-clean chamber and applying a second magnitude of source power to said pre-clean chamber after said first magnitude of source power.

Claims 7-12, and 18-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over The Admitted Prior Art in view of Matsumoto (US 2004/0011466) as applied to claims 1-6, 11, and 13-17 above, and further in view of Chen (US 2002/0072016).

With respect to Claim 7: The Admitted Prior Art in view of Matsumoto discloses a process in accordance with claim 2.

The Admitted Prior Art in view of Matsumoto does not expressly state that said applying a first magnitude of source power to said process chamber comprises increasing said source power from 0 watts to about 100 watts and said applying a second magnitude of source power to said process chamber comprises increasing said source power from about 100 watts to about 340 watts.

Chen discloses a bias power range from 0 watts to about 100 watts (Paragraph 51) and a second range of bias power from about 100 watts to about 340 watts (Paragraph 51). The Admitted Prior Art in view of Matsumoto and Chen are analogous art because they are from the same field of endeavor, namely plasma cleaning processes.

At the time of invention, it would have obvious to a person of ordinary skill in the art to form the process of the Admitted Prior Art in view of Matsumoto to include a first magnitude of source power to said process chamber comprises increasing said source power from 0 watts to about 100 watts and said applying a second magnitude of source power to said process chamber comprises increasing said source power from about 100 watts to about 340 watts in view of the teaching of Chen. The suggestion or motivation would have been to improve the effectiveness of the etchant residue removal process (Paragraph 51).

With respect to Claim 8: Matsumoto discloses that said removing said at least one antenna from said pedestal assembly comprises the step of removing said at least one antenna (Fig. 10 Item 10a, Paragraph 77) from at least one antenna opening (Fig. 10 Item 10b) in said pedestal assembly and further comprising the step of filling said at

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least one antenna opening (Fig. 10 Item 10b, Paragraph 77). The antennae or position of each antenna (Fig. 10 Item 10a) are movable or changeable, depending on conditions such as process gas, pressure, and electric power.

With respect to Claim 9: The Admitted Prior Art discloses said pedestal assembly (Fig. 2 Item 34) comprises an insulator (Fig. 2 Item 36) and a pedestal carried by said insulator for supporting said substrate (Fig. 2 Item 32), and wherein said at least one antenna opening extends through said insulator (Fig. 2 Item 42).

With respect to Claim 10: Matsumoto discloses that said at least one antenna opening comprises a plurality of antenna openings (Fig. 10 Item 10b) and said at least one antenna comprises a plurality of antennae (Fig. 10 Item 10a).

With respect to Claim 12: The Admitted Prior Art in view of Matsumoto discloses a process in accordance with claim 11.

The Admitted Prior Art in view of Matsumoto does not expressly state that said applying a first magnitude of source power to said process chamber comprises increasing said source power from 0 watts to about 100 watts and said applying a second magnitude of source power to said process chamber comprises increasing said source power from about 100 watts to about 340 watts.

Chen discloses a bias power range from 0 watts to about 100 watts (Paragraph 51) and a second range of bias power from about 100 watts to about 340 watts (Paragraph 51). The Admitted Prior Art in view of Matsumoto and Chen are analogous art because they are from the same field of endeavor, namely plasma cleaning processes.

At the time of invention, it would have obvious to a person of ordinary skill in the art to form the process of the Admitted Prior Art in view of Matsumoto to include a first magnitude of source power to said process chamber comprises increasing said source power from 0 watts to about 100 watts and said applying a second magnitude of source power to said process chamber comprises increasing said source power from about 100 watts to about 340 watts in view of the teaching of Chen. The suggestion or motivation would have been to improve the effectiveness of the etchant residue removal process (Paragraph 51).

With respect to Claim 18: A process for reducing generation of particles in a pre-clean chamber having a pedestal assembly for supporting a substrate and a plurality of antennae provided in said pedestal assembly for conducting bias power, comprising the step of subjecting said substrate to a pre-clean etch process.

The Admitted Prior Art does not expressly state a step removing said plurality of antennae from said pedestal assembly.

Matsumoto discloses a plurality of removable antennae (Fig. 10 Item 10a, Paragraph 77) from insulating tubes (Fig. 10 Item 10b, Paragraph 58) within a process chamber (Fig. 10 Item 1). The Admitted Prior Art and Matsumoto are analogous art because they are from the same field of endeavor, namely plasma processing systems.

At the time of invention, it would have been obvious to form the process of the admitted prior art including a step removing said plurality of antennae from said pedestal assembly in view of the teaching of Matsumoto. The suggestion or motivation

for doing so would have been to change the position of the antenna, whereby the plasma distribution in the process chamber can be changed (Paragraph 77).

Further, The Admitted Prior Art in view of Matsumoto does not expressly state the process comprises the steps of; said increasing a source power for said chamber to about 100 watts and increasing said source power from about 100 watts to about 340 watts.

Chen discloses a bias power range from 0 watts to about 100 watts (Paragraph 51) and a second range of bias power from about 100 watts to about 340 watts (Paragraph 51). The Admitted Prior Art in view of Matsumoto and Chen are analogous art because they are from the same field of endeavor, namely plasma cleaning processes.

At the time of invention, it would have obvious to a person of ordinary skill in the art to form the process of the Admitted Prior Art in view of Matsumoto to include the process comprises the steps of; said increasing a source power for said chamber to about 100 watts and increasing said source power from about 100 watts to about 340 watts in view of the teaching of Chen. The suggestion or motivation would have been to improve the effectiveness of the etchant residue removal process (Paragraph 51).

With respect to Claim 19: Matsumoto discloses that said removing said plurality of antennae (Fig. 10 Item 10a) comprises the step of removing said plurality of antennae (Fig. 10 Item 10a) from a plurality of antenna openings (Fig. 10 Item 10b) and further comprising the step of filling (Paragraph 77) said plurality of antenna openings (Fig. 10 Item 10b).

With respect to Claim 20: The Admitted Prior Art discloses said pedestal assembly (Fig. 2 Item 34) comprises an insulator (Fig. 2 Item 36) and a pedestal carried by said insulator for supporting said substrate (Fig. 2 Item 32), and wherein said at least one antenna opening extends through said insulator (Fig. 2 Item 42).

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Sahin (US 6465051) teaches a method of operating high density plasma CVD reactor with combined inductive and capacitive coupling. Mizuno (US 2004/0040665) discloses an electrostatic chuck with a plurality of electrodes.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to James A. Fiorito whose telephone number is (571)272-7426. The examiner can normally be reached on Standard.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Parviz Hassanzadeh can be reached on (571) 272-1435. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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